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ABSTRACT

This volume is the first of five volumes describing a systematic approach for constructing task inventories, surveying the task performance of occupations, and analyzing survey data to determine the appropriate performance content for job training. (The approach, referred to as the task survey process, is designed to be of value to both occupational curriculum personnel and those persons concerned with noncurriculum issues of occupational description and updating of job content information.) This introductory volume is intended for agency and institutional management personnel. It provides an overview of the task survey and selection system, its rationale, and tested effectiveness. Four major sections are included: Introductory Overview of the Curriculum Content Derivation System; Background and Rationale (curriculum--product or process, present focus on curriculum planning, and systematic processes for identifying curriculum content); Expanded Overview of the Task Survey Process; and Putting the Process into Action: Implementation Considerations. A glossary and references are appended. (SH)

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Research and Development Series No. 121

# PERFORMANCE CONTENT FOR JOB TRAINING

## VOLUME 1

## INTRODUCTION

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U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
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U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

National Institute of Education

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## FOREWORD TO ALL VOLUMES

The Center for Vocational Education is continuing programmatic research to develop more effective procedures for identifying valid and necessary curriculum content. One product of this effort is the five-volume description of procedures for constructing task inventories, surveying the task performance of occupations, and analyzing survey data to aid curriculum planners and developers in determining the appropriate performance content for job training. The procedures are intended to be of value to both occupational curriculum personnel and those persons concerned with non-curriculum issues of occupational description and updating of job content information.

This set of procedures revises and considerably expands upon an earlier version of task inventory and survey procedures in The Center's report authored by William Melching and Sidney Borcher, R&D Series No. 91, *Procedures for constructing and using task inventories,* March 1973. The initial procedures profited greatly and drew heavily from the report by Joseph Morsh and Wayne Archer at the USAF Personnel Research Laboratory, *Procedural guide for conducting occupational surveys in the United States Air Force.* Center development of the inventory and survey process has concentrated on their adaptation to purposes of helping in the derivation of curriculum content. This adaptation has included greater concern for how a task is stated, what task information should be obtained, and how to use this task information in selecting the more relevant and critical content that warrants consideration as a learning objective.

The total set of volumes in this series consists of the following titles:

*Volume 1: Introduction.*

*Volume 2: Stating the tasks of the job.*

*Volume 3: Identifying relevant job performance.*

*Volume 4: Deriving performance requirements for training.*

*Volume 5: Processing survey data: Technical appendices.*

This focus upon the performance content of specific occupations is parallel to The Center's concern for the *conceptual* and *affective* content of training, as published in earlier reports, R&D Series No. 98 and 105. Results of several research applications of portions of the process as it was being developed are published as R&D Series No. 86, 87, 88, 108, 109, and 110. Currently underway is an exploratory study of more generally applicable skills that may be used in different occupational areas as well as within a particular occupation. Such occupationally transferable skills or competencies would seem to be useful complements to the present concern for job-specific content.

This introductory volume, Volume 1, is intended for agency and institutional management personnel. It provides an overview of the task survey and selection system, its rationale, and tested effectiveness. Curriculum content is operationally defined on the basis both of its inclusion and its emphasis in a training program.

The procedures benefit from a variety of reported research studies and experiences of many persons over the last several years, notably that work sponsored and conducted by the USAF Personnel Research Laboratory. That line of research began in the Air Force with the early and insightful work conducted by such applied psychologists as J. C. Rupe, Llewellyn Wiley, Francis Harding, Ernest McCormick, Joseph Morsh, and Raymond Christal. The initial impetus for adapting the task survey process for use in deriving occupational training content in public vocational education programs is attributed to Raymond Christal and Edward Morrison.

There also has been extensive input from the many vocational educators, curriculum developers, occupational instructors, employers, job supervisors, and workers themselves who have been involved in various aspects of trving out different portions of the process reported here. Their cooperation and participation have been an invaluable and essential ingredient in the development of the procedures reported in these volumes.

Of particular note, by their extensive participation and cooperation with several trial survey administrations throughout the procedural development of the present procedures are James Blue, Tom Hindes, the late Ron Meeks, and James Wall. Recognition of the considerable support provided in the administration of Task Inventory Questionnaires to several hundreds of workers and supervisors in their respective states also is gratefully extended to Deborah Bloxom, Ross Byrd, Gloria Cooper, Fern Green, Joseph Kelly, Patrick Weagraff, and Clifford Zenor.

Providing valued assistance in various stages of the development process over time have been a number of project and Center staff. These especially include Duane Essex, Michael Mead, Edward Morrison, Earl Russell, Jerry Walker, Allen Wiant, and Keith Widaman. Providing critical reviews of the five volumes in this series, and making very helpful suggestions for their improvement were Larry Casterline, Linda Glosson, Mauritz Johnson, William Melching, Robert Stump, and Allen Wiant. Serving as the Project Officer representing the sponsor of this work, the National Institute of Education, Robert Stump provided the most necessary understanding and assistance that permitted these volumes to be completed. Quite obviously, this work depended upon the support and assistance of a great many persons over time. The contributions of all are gratefully acknowledged.

Continued improvement of the methodology can be anticipated as wider experience is gained in the implementation of task inventories and occupational surveys. It is hoped the present procedural descriptions may be of immediate use and value in aiding and promoting such implementation. By such means there should be increasing assurance that curriculums and instructional materials provide for those things most appropriately learned in a training program, and that students will be learning skills which are important to and required for effective job performance.

Robert E. Taylor
Executive Director
Center for Vocational Education

# INTRODUCTORY OVERVIEW OF THE CURRICULUM CONTENT DERIVATION SYSTEM[1]

For curriculum planners and developers, the five-volume *Performance Content for Job Training* offers a systematized and data-based approach for deriving curriculum content for programs of occupational preparation. It is responsive to recent findings which maintain that the content and emphasis of curriculums are far more likely to influence learning achivement than are the media, methods, or strategies for teaching the content. For occupational preparation and job training programs, the usefulness of curriculums depends on their reflecting the performance requirements of the occupations being studied.

This systematized approach to the gathering and use of field information, referred to in this set of volumes as the Task Survey process, is designed to assist planners of occupational training programs to produce a useful information base for responding to such questions as: (a) How can the necessary training content be identified when it is uncertain what is done by workers on the job? (b) How can the content of an existing program be justified? (c) How can it be assured that graduates are effectively prepared for their occupation if they should move outside this community? (d) How can it be routinely determined that the content of a program is up to date? (e) How can it be determined that a program's content is not wasteful of student time and of learning resources? (f) How can employers be informed of what particular skills and knowledge are acquired by training graduates? (g) How can the performance content of an occupation be established, so that the job relatedness of worker competency tests can be validated?

These questions deal with matters of the job relevance and appropriateness of training content: Criticalness, comprehensiveness, and timeliness. Such concerns are the focus of the procedures described in the five volumes. Concurrently, the procedures serve to economize on efforts at content derivation, by systematically narrowing the focus as increasing attention to content detail is warranted in the curriculum development process.

The intent of the system is to aid developers and planners of occupational curriculums in their efforts in education, business, industry, and government to (a) determine the task performance content of jobs for which students are to be prepared, and (b) select from a large body of verified job content that which is most important for training consideration. The system largely depends upon

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[1] Adapted from product description prepared for the National Institute of Education (U.S. Department of Health, Education, & Welfare, 1976).



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task data obtained by survey questionnaires from persons closest to, and most knowledgeable about actual performance and its requirements. It will be most cost effective in repeated surveys of occupations, in situations where an instructional program is being developed or verified for use in many institutions or instructional settings (such as is done by state and regional vocational curriculum laboratories) or by industrial training departments that service multiple subsidiary units. The procedures are intended to be of special benefit *where there is uncertainty* with regard either to relevant performance or appropriate curriculum content, or where there is need to establish the job-relatedness and merit of existing curriculums.

In addition to their use for curriculum development, the derivation procedures offer the possibility of new approaches to the problems of the effective tracking, assessment, and reporting of learning achievement. The adoption and use of selected procedures potentially could facilitate open-entrance/open-exit instructional programming and could provide learners, employers, and instructional personnel with more useful information in the form of performance credentials for training, placement, and career progression.

The full system is a sequential one that proceeds from a policy decision to prepare a curriculum, to the stating of terminal learning objectives. Some of the system components are optional, for use only when more than one job is part of the scope of interest. Some components also offer procedural variations to fit differing circumstances. In addition, many of the components have some stand-alone value, capable of being applied in modular units depending on previous information available or upon differing needs and uses for the information.

In abbreviated form, the sequence of components established for the Task Survey process is:

1. Determining the occupational scope of interest.
2. Constructing comprehensive lists of job tasks.
3. Obtaining task data and ratings from workers and supervisors.
4. Determining the job relevance of tasks, and reporting the descriptive results.
5. Selecting tasks for instructional consideration.
6. Determining the performance level to which each task should be developed.
7. Formulating statements of terminal performance objectives for the purpose of communicating the intent of the learning program.

Optional components for additional analysis or comprehensiveness include (a) determining the existence of job types within an occupational area, (b) determining the areas of training emphasis appropriate for each selected task, and (c) identifying technical concepts having value in the performance of each task.

Procedural steps for accomplishing this sequence are described within 11 major activity headings in three of the volumes. Volume titles and the 11 activity sections are as noted below, with a brief discussion of the content and purpose of each volume.

*Volume 1. Introduction.*

Intended for agency or institutional management personnel, providing an overview of the system, its rationale, and tested effectiveness. Curriculum content is operationally defined on the basis both of its inclusion and its emphasis in a training program. A glossary of terms is appended.

*Volume 2. Stating the Tasks of the Job.*

Activity A: Starting the Process

Activity B: Understanding the Nature of Task Statements

Activity C: Constructing the List of Potential Tasks

Guides the reader through an explicit set of procedural steps, beginning with guidelines on how to define the scope and limits of occupational interest for a particular task inventory and survey, and resulting in a comprehensive, but unvalidated, listing of tasks for an occupation or occupational area.

*Volume 3. Identifying Relevant Job Performance.*

Activity D: Planning Survey Design and Analysis

Activity E: Administering Questionnaires to Workers and Supervisors

Activity F: Processing Survey Data

Activity G: Reporting the Survey Results

Describes how to survey the tasks performed in an occupation to establish their job relevance for a variety of job description purposes. Users interested only in job description portions of the process, not in curriculum content, may omit the next set of activities in Volume 4.

*Volume 4. Deriving Performance Requirements for Training.*

Activity H: Planning Survey Design and Analysis (Additions to Activity D)

Activity I: Processing Survey Data (Additions to Activity F)

Activity J: Stating the Terminal Performance Objectives

Activity K: Considering the Possible Uses of TPO's

Accompanying the survey activities of Volume 3, these additional activities seek and process information for making curriculum content decisions, resulting in statements of job-relevant performance that is expressive of the terminal learning objectives.

*Volume 5. Processing Survey Data: Technical Appendices.*

Describes a computer program that can be used to process such occupational survey data, and summarizes the analyses that entered into the determination of the task selection process of Volume 4.

# BACKGROUND AND RATIONALE

## CURRICULUM: PRODUCT OR PROCESS?

For the purpose of this curriculum content derivation system, the concept of "curriculum" is considered to be "intended learning outcomes" which have been selected and ordered. This view of the nature of "curriculum" as being a *product* which states "what is to be learned" by a learner is based directly upon Johnson's (1967, 1969) definitive considerations of curriculum theory. This view distinguishes between curriculum and instruction, where instruction is the *process* by which intended learning outcomes are achieved. Curriculum, on the other hand, consists of a structured series of intended learning outcomes (Johnson, 1967).

Herrick (1962) provides some additional justification of this content and process distinction, both aspects being necessary and critical, but each is a distinct component of the educational structure. The dual nature of curriculum as the term is commonly used (i.e., outcomes or experiences) accommodates the two groups of curriculum theorists, where one group "sees the selection and ordering of objectives expressed in terms of 'learnables' as the essence of the curriculum task, . . . (the other group) views the stating of objectives as only one early step in curriculum development" (Johnson, 1969, p. 5).

Since some curricular proponents view curriculum as the totality of the instructional system having impact upon learners, while the procedures in these volumes have a much more limited reference, it seems most useful to distinguish among the several aspects of that system. Thus, the basic distinction is made here between (a) *what* is to be learned (curriculum) and (b) *how* such learning is to be attained (instruction). Several secondary distinctions could pertain to *why* something is to be learned (e.g., policy decisions on educational priorities), or to subsystems of instruction (e.g., teaching aids and learning materials that are for use in a classroom).

To help clarify these various features of a curriculum system, Figure 1 illustrates the process and the product labels which are generally used in this paper for the why, what, and how aspects of the educational system. This effort at clarification is derived from Johnson's (1969) process-product distinctions. The major aspect dealing with the *implementation* of curriculum and instructional plans, is shown set apart from the more purely design and planning parts of education. While it is not intended to imply that planning does not occur in real-time interactions with students, the emphasis here is on the systematic design and planning efforts that occur prior to actual instruction.

The typical sequence of key steps in a complete instructional planning system begins with (a) the policy guidance of a responsible agency as to the general aims and scope of an intended instructional program, proceeding then to (b) the determination of intended learning outcomes, to (c) the design of overall instructional plans, to (d) the development of specific teaching strategies and

materials, and on to (e) tryouts of the instructional elements with actual students. Thus the system thematic planning process proceeds with increasing specificity and attention to local system and student learning environments, until individual student interactions with the instructional content are encountered.

Integral to the whole planning process is an overlay of assessment activities. Regarding the validity of curriculum content selection, Johnson (1967) noted that the assessment "must rest on some criterion other than instructional results" (p. 135). This evaluation is concerned both with the omission of significant intended learning outcomes and the inclusion of insignificant ones. The more traditional type of evaluation is concerned with effectiveness upon students of the contrived learning experiences to which students are subjected. *Evaluation of instructional effectiveness* should be performed without the confounding influence of variations in the curriculum, just as the *evaluation of curricular content* should not be influenced by variations in instruction.

| | Process | Product |
|---|---|---|
| *WHY* curriculum is to be learned | Policy Setting | Policy Decisions: Educational Aims |
| *WHAT* is to be learned | Curriculum Planning and Development | Curriculum Content: Intended Learning Outcomes |
| *HOW* curriculum is to be learned | Instructional Planning and Design of Learning Experiences | Instructional Plans |

| | | |
|---|---|---|
| *HOW* curriculum content and instructional guides are implemented with learners | Instruction or Teaching | Learning Experiences |

**Figure 1. Distinguishing labels for major planning processes and products.**

# PRESENT FOCUS ON CURRICULUM PLANNING

Only the early front-end portions of the total planning sequence are covered in the present volumes. For a complete curriculum and instructional planning system, the secondary aspects must also be included. However, for purposes of the present procedures, attention is directed only toward the systematic planning functions which are concerned with the determination of *what* is to be learned (i.e., the curriculum). Only token acknowledgment is given to the policy and instructional aspects of the system, for as Herrick (1962) has stated, "There is no question but that in the past 30 years in curriculum development, greater attention has been given to the study of child development and to the social scene than was given to the nature of subject matter and its selection and organization for instructional purposes" (p. 65).

Increasing awareness and recognition of the need for attention to curriculum matters is becoming evident. Flanagan (1973), having studied educational programs and student populations for many years, has emphasized that

> Recent experience indicates that the quality of the present educational programs can be improved more by systematic selection of *what* is to be taught than by improving *how* it is taught (p. 551).

It is to this issue of systematic selection of curriculum content, the intended learning outcomes, that the present volumes are directed.

This Curriculum Planning and Development phase (Figure 1) is where the capabilities and knowledge of specialists in many disciplines are called upon. There is a need for job analyses, questionnaire construction, survey administration, contacts with employers and various organizations, data processing, statistical analyses, and report preparation and printing. The continuing availability of specialists in such functions is most likely to be found on the staff of state educational agencies, large city school districts, state universities, major business and industrial firms, military technical training schools, professional associations, and research and development organizations concerned with human resources. At the local school level it is generally unlikely that a sufficient range of information sources are available. Thus, it is expected that this curriculum planning function be accomplished usually under the sponsorship of an agency having a broad jurisdiction: Nationwide, regional, large state, consortium of states or businesses, professional or labor association, or corporate training headquarters.

> Systematic data-based procedures for the derivation of curriculum content for occupational training programs are applied most effectively at a level where a large number of schools, classes, or students can benefit from the results. It simply is not cost effective for everyone to duplicate the analysis of the same performance situations. Though staffs of individual schools and departments often do their own curriculum planning and development, the infrequency with which their programs are shared with others would seem to make such curriculum preparation efforts less than fully economical.

# SYSTEMATIC PROCESS FOR IDENTIFYING CURRICULUM CONTENT

Several approaches have been pioneered by the educational and training research staffs of the military services in response to the apparent usefulness of systematic and data-based means for determining curriculum content appropriate to occupational training programs. These approaches have included such complete planning processes as Instructional System Design (DAF, 1970, 1973; ICISD, 1975) which is an outgrowth of the prior Qualitative and Quantitative Personnel Requirements Information (QQPRI) system of the U.S. Air Force and the Systems Engineering of Training of the U.S. Army (DA, 1972). More specific procedures for accomplishing the content identification portion of such overall systems have also been studied. The most well known and thoroughly researched of these techniques is the use of task inventories to obtain job performance information by means of questionnaire surveys of many workers in an occupation (Morsh, Madden, & Christal, 1961; Morsh & Archer, 1967; Christal, 1974).

This task inventory and occupational survey approach, in various forms, has become the basis for a number of recent major studies of occupations by public educational and governmental agencies. The Vocational-Technical Education Consortium of States, V-TECS (Hirst, 1975) uses the Air Force procedures (Morsh & Archer, 1967) quite directly to describe occupational domains for their catalogs of performance objectives. Similarly, a recent job analysis plan developed by the Office of Texas State Comptroller of Public Accounts (Van Cleve & Porachan, 1976) employs these procedures to obtain ongoing job analyses of department job positions in a timely, cost-effective, and quantifiable manner. The same basic procedures have also been used successfully in some of the research and development projects of AT&T's Human Resources Laboratory (Gael, 1975) to describe jobs and identify similarities and differences between them, as a potential central component in an ongoing personnel management system.

Work activity checklists having numerous similarities to the task inventory and occupational survey approach have been the basis of many job studies. Berger (1974) used such checklists and worker ratings of job activity statements to serve as a basis for a sound certification and licensing program that might potentially be developed by a professional association. West (1973) used a similar approach to provide explicit information and recommendations for updating secondary curriculums in relation to actual jobs of employed workers. Terry and Evans (1973) were able to distinguish specialty areas warranting differential training programs within an evolving occupational area.

While many other applications could be cited, both for job description purposes and for developing training curriculums, both in public and private agencies, there are certain common threads woven through each (Gael, 1975; Moore, 1976):

1. Comprehensive listings of tasks that comprise the specific job activities, serving as the basic unit of an occupation for analysis purposes.

2. Heavy reliance upon job incumbents (or others very close to the actual work situation) as the primary sources of information.

As Gael (1975) comments, "The differences between the methods appear to be mainly in format and in the kind and amount of auxiliary data—such as task importance, task difficulty, task time, etc.—requested about tasks" (p. 87). The procedures have been used on equipment oriented jobs, clerical occupations, technician jobs, professional occupations, and managerial positions.

The task inventory and occupational survey process is essentially a job description technique. It is used to identify the meaningful activities of job performance as they occur in a range of employment settings. The term "task analysis" is often applied to this process, but that term more accurately describes quite a different process. Task analysis is the psychological study of an individual task, to identify the behavioral categories that are relevant to learning (Miller, 1962; McCormick, 1976). The task inventory and occupational survey approach more accurately should be considered as "task description" in that it "specifies the *terminal* (end-of-course) *performance* of trainees, and thus the *content* of training" (Cunningham & Duncan, 1967, as cited in McCormick, 1976).

In the survey process tasks are used as the unit of analysis for describing and characterizing the relevant job performance activities. Thus, it is the *job* that is being described by means of tasks. Tasks are not being analyzed for their component behavior and necessary learning structure, though such analysis of complex tasks that are difficult to learn may well be some later step in the complete design and structuring of training.

**Advantages to the use of task inventories and occupational surveys.** Elaborating upon advantages noted by Christal (1970), task inventory and survey methodology has the capacity of achieving such advantages as:

1. *Representativeness.* Data can be collected from many persons who are directly knowledgeable of what does and should occur on the job, and this data can be separately constructed for population subgroups to permit group or situational comparisons and contrasts.

2. *Economy.* Data can be collected from many persons by questionnaire for less than it would cost to collect data from a few persons by standard job analysis methods. Repeated data collections permit reuse of previously constructed inventories and data. The questionnaires can be mailed and self-administered.

3. *Comprehensiveness and Validity.* Extensive inventories of job activities are promoted, permitting response data to point out variations in job relevance of the items, unprejudiced by preconceived notions of what is relevant and critical. Use of task recognition, rather than recall, enables respondents to provide far greater detail and completeness in the available time.

4. *Comparability.* Research substantiates the reliability of group responses. Standardization of items and response formats permits assessment of trends over time, and comparison with related jobs or other inventory studies. The comparative analyses permit resolution of some uncertainties with respect to regional differences and of newly emerging job types within an occupational area.

5. *Quantification.* The questionnaire information for the most part is quantifiable, allowing it to be stored, processed, analyzed, and reported by computer. Conventional statistical techniques may be applied in many instances to produce desired analyses.

6. *Job Improvements.* Clues may be obtained by certain task questions for areas and means where some job improvements might be very useful. Additional clues can be obtained for redesigning jobs and job lattices.

**Hesitancy to use the inventory and survey techniques for curriculum development.** While the essence of the task inventory and occupational survey techniques have been useful in a wide range

of situations, they have been applied predominantly (outside the military services) in specially commissioned one-time studies. Task survey procedures, with the exception of the recent V TECS program (Hirst, 1975), have not been applied routinely to service curriculum content planning.

There are several reasons for this apparent hesitancy to employ what would seem to be a significant advance in the technology of curriculum development. Among these reasons are such concerns as:

1. Uncertainty as to whether large-scale surveys of worker groups were feasible for other than military jobs where there existed greater structure of work settings and access to the workers.

2. Uncertainty about how to state tasks in a form useful for curriculum purposes, since much of the development of the process was directed to job description issues where very general expressions of work activity were adequate.

3. Uncertainty concerning what types of task data were necessary; although a wide array of information has been gathered in previous studies, most of which appears useful to some degree, it is not feasible to collect very many types for each task of an occupation.

4. Uncertainty concerning meaningful procedural roles for local instructional personnel and of community interests, and unwillingness (properly so ) to remove them from the curriculum development process.

5. Uncertainty as to the cost-effectiveness of such data collection and systematic derivation of curriculum content, particularly for application of the procedures by each individual training system or institution.

6. Uncertainty as to whether programs in occupational preparation should train for specific occupations or provide a general background for a wider range of related occupations.

7. Uncertainty whether large scale job description and survey procedures could be routinely performed by other than highly trained specialists.

**Development of the Task Survey process for use in curriculum planning and development.** Each of these issues of user uncertainty was of particular concern in the developing and testing of the procedures for the Task Survey process that is reported in the present volumes. The development efforts sought to provide useful solutions by which the approach could effectively serve the needs of curriculum planning and development. Certainly not all problems have been resolved, but hopefully significant progress is represented. We have tried to be sensitive to these issues, as well as to make the application of the process produce worthwhile results in an economical manner. Throughout the volumes we have tried to suggest ways that have been found to work.

In the development of these procedures, studies were conducted using three diverse occupations (Automotive Mechanics, Business Data Programmers, General Secretaries) to try out the methodology under a variety of field-use conditions. Reports of these companion studies were published earlier as supportive documentation for the development of the Task Survey process. Procedural modifications were made as necessary, particularly to accommodate the peculiarities of diverse occupations and data collection conditions.

Rules and procedures were studied by which task performances could be selected that most warranted instructional consideration. The statistical process used to establish these rules and procedures

is summarized in Technical Appendix B of Volume 5. Special attention was given to establishing procedures which optimize their generalizability over different occupations.

Regarding the uncertainties expressed above for implementing task inventory and survey techniques, the following conclusions appear warranted for the Task Survey process described in Volumes 2, 3, and 4.

- *Survey feasibility:* It is quite possible and reasonable to collect task data from workers and supervisors in a variety of civilian employment contexts. Given some mechanism for establishing individual contact with workers and with employer representatives, good cooperation and job reporting can be obtained with high rates of return of usable survey questionnaires.

- *Form of task statements:* It is necessary to employ statements of specific work activity for them to be most useful for curriculum purposes. Volume 2 presents an extensive discussion of the requirements for this most important part of the process.

- *Types of task data:* A minimum of three classes of task data serve well the needs of curriculum content derivation. These are (a) extent of task occurrence, (b) level of task significance to the job, and (c) degree to which formal school training is suggested as the primary location for task learning to occur.

- *Procedural roles:* Various interested and capable parties need to be incorporated at particular points in the process where their input will be most effective and useful. Those closest to the occupation and its actual performance requirements provide task data. Specialists construct task statements, design survey administration, and analyze questionnaire data. Craft or other available job advisory committees or representative groups can be most useful in reviewing results at different stages for meaningfulness, clarity, comprehensiveness, and accuracy. Where local or special interest concerns are meaningful, these also have some influence. Subsequently, instructional professionals become responsible for establishing the process of how the intended learning outcomes are to be achieved.

- *Cost effectiveness:* One-time application of the full process by each individual training system or institution would not be cost effective, even though there may be value in resolving content uncertainties or in verifying the appropriateness of existing curricular content. Economy is achieved through sharing and repeated use of task surveys. Broad utility can be achieved by surveying occupations across a wide array of representative employment settings, such that results can be shared with many training programs. Additionally, initiating agencies can readily readminister task questionnaires with minimal reworking of task lists and questionnaire forms. Local agencies may make use of materials and data prepared for larger and more job representative surveys, to identify important local variations. Availability of task lists developed by others and accessed via such services as the Task Inventory Exchange (see Volume 2, Step 2) allows everyone to benefit from the prior efforts of many good studies.

  Implementation of the Task Survey process in a particular instance also involves some other cost-effective features:

  1. Though the process begins with a comprehensive view of an occupation, to preclude erroneous or biased preconceptions, it systematically narrows the focus to matters of job relevance and importance. This has the effect of

allowing concentration of time and resources for more highly detailed analyses at those points where such efforts would be most beneficially applied.

2. Collection of task data is simplified to require the fewest types of questions necessary and to obtain highly reliable information with a minimum of effort for questionnaire respondents.

3. Staff time and travel by the implementing agency can be reduced to a minimal level by use of questionnaire administrators already situated near the locales to be surveyed.

4. Extensive examples of materials, formats, and data processing routines are included in the descriptive volumes, permitting reasonably direct application without the need for creating them anew.

- *Specificity of occupational scope:* Whether occupational training should be broad or narrow in scope is not resolved by these procedures. That issue is left up to policy decisions by each responsible training agency. However, the Task Survey process can accommodate either concern, though the procedures are simpler to apply to specific occupations than to clusters of related occupations. The process, indeed, might be of use for any definable performance situation, regardless of whether it be a work or a life situation.

- *Routine application:* Professional staffs of key educational and training agencies, or specialized units of such agencies, can be expected to learn the procedures and to apply the process effectively. The volumes should be able to function as a handbook and guide for doing the procedures described. With experience will come competence. Close supervision of early attempts will be essential, particularly for the construction of task statements, design of survey administration, and analyses of data. The volumes, however, were not intended, nor are they completely suitable, as instructional material for initial learning the first time through. Background information from previous research and lists of references should be particularly useful in developing or increasing competence in specific areas.

**Value: What will this process help the curriculum planner do better?** The methodology can be of use in achieving (a) conservation of trainee time, (b) conservation of training resources, (c) updates of occupational performance descriptions, (d) curriculum accountability, (e) performance-oriented learning objectives, (f) content validation of occupational performance tests, (g) competency records of training and achievement, and (h) articulation of job performance aspects of secondary-postsecondary occupational curriculums.

This is not to say that the Task Survey approach can perfectly address all of these needs. The procedures and guidelines in the present volumes make an attempt to adapt the approach to the needs of curriculum developers, advancing their capacity to employ systematic data-based procedures in a fashion that will create good information bases and to share that information with others.

The value of the systematic Task Survey process for identifying curriculum content is that data-based curriculum decisions are possible, uncertainties concerning content can be resolved, and increased assurance can be given that instructional resources are being properly directed. Developers of vocational and occupational training programs can better assure users of their curriculums and instructional materials that the things to be learned in the training program are the things most appropriately learned there; and that, when they use their materials, students will be learning skills which are important to and required for effective performance in the occupation.

Among the specific purposes that might be served by application of all or portions of the Task Survey process are those listed below. These differing purposes to which the process might be applied are grouped in order of the increasing sensitivity of analysis that is possible

### Using General Statements of Work Activities

*For Purposes of Occupational Description, as a Function of Task Questions Only on Job Relevance*

- To define performance characteristics of an occupation.
- To define performance characteristics that distinguish each occupation within an area of related occupations (job clustering).
- To define performance characteristics that distinguish each skill or career level within an occupational ladder.
- To determine emerging or changing job structures.
- To record training progress or provide items for individual competency transcripts.

### Using Specific Statements of Work Activities (Tasks)

*For Purposes of Occupational Description, as a Function of Task Questions Only on Job Relevance*

- To provide separate description of work performed by subgroups of differing worker backgrounds.
- To validate the content of employment tests, licensing requirements, or other such selection devices.

*For Purposes of Curriculum Content Identification, as a Function of Task Questions Only on Job Relevance*

- To verify the current occupational relevance of existing program content.
- To survey employer expectations for new employees.

*For Purposes of Curriculum Content Identification, as a Function of Task Questions Both on Job Relevance and on Training*

- To select relevant content that most warrants consideration for pre-employment training.
- To compare curricula of different levels of training institutions, such as to examine the articulation of secondary-postsecondary programs.
- To assure that existing curricular content is currently appropriate.

- To identify task features that warrant emphasis in training, to focus efforts in accomplishing more detailed task analyses.
- To compare training needs of local job market with those of larger employment areas.



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# EXPANDED OVERVIEW OF THE TASK SURVEY PROCESS

## WHAT FUNCTIONALLY GETS ACCOMPLISHED

The "Task Survey" process is the basis for the methodology reported in the present volumes. Also sometimes called the "Task Inventory" method, it is a survey-questionnaire approach to job analysis for providing performance data of use in deriving job relevant curriculum content that is important for occupational training programs. The procedures seek to weed out the irrelevant and unessential job knowledge and performance content, as well as those aspects not appropriate for school training, leaving only that which warrants further in-depth analysis of learning requirements. This narrowing of focus is done in a comprehensive and systematic manner. In the process useful clues should emerge for further analyses and for structures appropriate to the learning process.

The overall approach is to use firsthand occupational task information to identify critical performance requirements that warrant formal training. Designed for use in many occupations of interest to public education and to industrial training, the methods are intended to be especially important for planning curriculums in situations where there is *uncertainty* about the occupational requirements and of the critical training content. The basic intent is to identify those tasks having the greatest training criticalness, eliminating the merely "nice-to-know" and unessential learning requirements.

Task Inventory Questionnaires obtain the necessary task data from a broad representative group of directly-knowledgeable persons: workers and supervisors. The selection procedures systematically process this large base of task information, so it may be used more readily as an information source by those persons who must ultimately make the curriculum content decisions.

Various components of the process, particularly in the preparation of the initial listing of tasks, encourage consideration of most of the major sources of information about the tasks of an occupation: published job materials, job analysis studies, employer training programs, available task inventories, curriculum guides, empirical studies, special projects, as well as employees and supervisors. Advisory committees made up of employers, experienced employees, supervisors, related manufacturers or professions, technical specialists, subject matter specialists, and teachers of occupational training programs can provide valuable aid in making the key decisions described throughout the process.

There is a real need to distinguish between *job content that is relevant to workers in the occupation* and *relevant job content that is important for pre-employment training.* Comprehensive listings of potential tasks performed by workers in an occupation, in conjunction with data about

how many workers do and should perform each task, help establish the relevance of the tasks to that job—at least for purposes of making decisions about training. Though some tasks may properly belong to a particular occupation, there would seldom be a concern for pre-employment training on any task unless it would likely be performed by some minimum of workers.

From those tasks found to be a reasonable part of the occupation (that is, job relevant to varying degrees), it then becomes meaningful to determine which ones are worthy of some expenditure of instructional resources and student time. Additional kinds of task information are needed to focus attention on the critical training needs, though relevance data are also useful for this purpose. Selecting those tasks which should be of training concern is a more uncertain process than determining their performance characteristics and extent of job relevance.

Some tasks may be performed frequently in an occupation but be of trivial interest for pre-employment training programs. This can occur for several reasons: (a) most students could be expected to be able to do the task before entering training, (b) training could be accomplished equally well or better on the job, (c) extensive job experience may be needed to learn a task, (d) task performance may differ quite radically among employment situations such that no standard learning requirement can be identified, or (e) only the more experienced workers are expected to perform a particular task, such that early learning of it would not likely be retained until needed. Conversely, the learning need may be immediate and obvious.

Job relevant tasks may or may not be appropriate for training because of a wide range of other reasons. While full resolution of this problem cannot be expected, the present methods attempt to use the least amount of task information that will serve the content identification purpose in a generalizable manner for differing kinds of occupations.

The three volumes containing directions for conducting occupational surveys are briefly described below. Volume 5 incorporates a computer program that can be used to process such occupational data.

*Volume 2: Stating the Tasks of the Job* (Steps 1-6)

Guides the reader through an explicit set of procedural steps, beginning with guidelines on how to define the scope and limits of the occupational interest for a particular inventory and survey. Discusses and illustrates various problems likely to be encountered when constructing such statements of work activity. Additional procedural steps cover the reviewing, editing, and pilot testing of task statements prior to their subsequent use in occupational survey questionnaires.

*Volume 3: Identifying Relevant Job Performance* (Steps 7-21)

Describes the design, administration, and analysis of questionnaire surveys of occupational performance. The purpose of this stage of the process is to produce a description of the extent to which task activities are part of the job expectancies of workers in a particular occupation or work function, or to differentiate between job types within an occupational area.

Bound separately from the training selection issues of Volume 4, this permits direct use for such noncurriculum purposes as validating each task as it pertains

to the occupation, to aid establishing the job relevance of the content of employment qualification tests.

*Volume 4: Deriving Performance Requirements for Training* (Steps 22 28)

Expanding on and accompanying the survey activities of Volume 3, these additional activities seek and process information for making curriculum content decisions along with the issues of job relevancy. The procedures are focused on pre-employment occupational preparation, particularly identifying the level of performance to which each task warrants development. A suggestion is also made for including significant technical concepts and areas of emphasis in the training for task competency. Statements of Terminal Performance Objectives serve to communicate to others the results of the content derivation process.

"Curriculum content," as used in this approach, is identified on the basis both of its intended *inclusion* and its *emphasis* in a training program. The use of task *inclusion* and *emphasis* as the key variables of "curriculum content" is based on the conclusions of Walker and Schaffarzick (1974) from their extensive study of what are the important influences on student learning achievement. They suggested that "achievement patterns generally follow patterns of content inclusion and emphasis" (p. 99), as opposed to the influence of different media, methods, or strategies of teaching. With content inclusion and emphasis being such apparently powerful determiners of what students learn, and Walker and Schaffarzick's conclusion that "outcomes reflect content" (p. 98), the present procedures attempt to operationalize these distinctions.

Content "inclusion" is here concerned with whether each particular task of an occupation should or should not receive *some* consideration in the curriculum. Content "emphasis" is concerned with the level of development of performance ability for each included task. This intended level of task development indicates *degree* of task emphasis. Additionally, "emphasis" can pertain to *area* of task emphasis, where particular nonperformance features of a task may be especially important for attention in the training process. The complete set of job performance content derived for an occupational program thus would portray that program's planned and intended pattern of content inclusion and emphasis; that is, the curriculum content.

Throughout the process there are a number of terms used which are specific to this process. As each is needed it is defined or explained in the context of its use in Volumes 2, 3, or 4. These terms are briefly defined in a glossary of terms located in the Appendix to this Volume 1.

## SPECIFIC PROCEDURAL STEPS

There are 28 steps for which procedures and guidelines are provided in the several volumes. These steps are listed in Table 1. Important considerations and limitations relevant to each step are, for the most part, included in the volume descriptions as needed for making key decisions and plans related to the step. Volumes 2, 3, and 4 provide front to back sequencing of the procedural steps, with minimal need for page flipping.

Table 1

Complete Listing of the 28 Procedural Steps

## Volume 2

### STARTING THE PROCESS

Step 1: Define the Occupational Scope.

### CONSTRUCTING THE LIST OF POTENTIAL TASKS

Step 2: Locate Written Sources.
Step 3: Construct Initial Listing of Tasks.
Step 4: Obtain Reviews of Initial Tasks.
Step 5: Edit Tasks for Use in Surveys.
Step 6: Pilot Test the List of Potential Tasks.

## Volume 3

### PLANNING SURVEY DESIGN AND ANALYSIS

Step 7: Determine What Results Are to Be Sought.
Step 8: Determine What Task Information Is Needed.
Step 9: Determine What Respondent Information is Needed.
Step 10: Determine What Data Summaries and Analyses Are Needed.
Step 11: Design Survey and Its Administration.
Step 12: Pretest Questionnaire Instructions and Format.

### ADMINISTERING QUESTIONNAIRES TO WORKERS AND SUPERVISORS

Step 13: Arrange to Have Questionnaires Administered.
Step 14: Instruct Local Administrators.
Step 15: Prepare Questionnaire Booklets.
Step 16: Acknowledge Cooperation of Agencies and Personnel.

### PROCESSING SURVEY DATA

Step 17: Prepare Questionnaire Responses for Processing.
Step 18: Cluster Workers Into Job Types.
Step 19: Compute Summary Descriptive Data.
Step 20: Perform Analyses of the Survey Data.

### REPORTING THE SURVEY RESULTS

Step 21: Prepare Reports of Descriptions and Analyses.

## Volume 4

### PLANNING SURVEY DESIGN AND ANALYSIS (ADDITIONS TO ACTIVITY D)

Step 22: Determine What Task Information Is Needed.
Step 23: Determine What Data Summaries and Analyses Are Needed.
Step 24: Design Questionnaire Format and Forms.

### PROCESSING SURVEY DATA (ADDITIONS TO ACTIVITY F)

Step 25: Select Tasks That Warrant Training Consideration.
Step 26: Identify Level of Task Development.
Step 27: Modify Task Performance Selections or Levels.

### STATING THE TERMINAL PERFORMANCE OBJECTIVES.

Step 28: State the Task Performance Content That Warrants Training.
Suggestion: TPO Expansion to Include Technical Concepts and Task Areas.

The process of deriving curriculum content begins in Step 1 with an initial definition of the intended scope and focus of the instructional program. Guidelines and illustrative materials are provided with which developers can make an initial determination of the performance situations and job activities for which students are to be prepared. Next, relevant job content is identified by means of task inventories and task performance data provided by persons closest to the actual job situation. For this purpose, Volumes 2 and 3 describe procedures (Steps 2-21) for constructing and validating occupational task inventories. This represents the more traditional process by which task surveys are used for job description purposes. Volume 4 adds additional procedures (Steps 22-28) to extend the survey to be useful also for decisions about appropriate curriculum content.

In practice, the steps in Volume 3 would be performed concurrently with the steps in Volume 4 when the survey purpose is the derivation of curriculum content. It should be noted that Steps 22, 23, and 24 (of Volume 4) parallel Steps 8, 10, and 11 (of Volume 3) to produce a single Task Inventory Questionnaire that serves both the needs of curriculum content selection as well as the needs for establishing the job relevance of tasks. Steps 22-28 are omitted if only job description purposes are of interest, such as for establishing what is the performance content of an occupation to support the content validation of employment tests (FEA Guidelines, 1976; EEOC Guidelines, 1976) or for validating an initial listing of tasks for an occupation.

The particular process used to select tasks (Step 25) simultaneously identifies the general level to which each task should be developed and demonstrable in training (Step 26). These identifications of "task level of development" range from (a) less than ability to actually perform the task; to (b) basic ability to do the task, but with no special requirements for accuracy, speed, or excellence; to (c) increasingly higher levels of performance competency.

Once a task has been selected as requiring some instruction, and the general level of development identified, it then becomes helpful to determine what nonperformance aspects or features of that task also should be especially emphasized in the instructional program. Suggestions for determining instructional emphasis are given after discussion of Step 28 in Volume 4.

The full curricular process leads to the statement of task learning objectives (Step 28), which are called Terminal Performance Objectives (TPOs). These statements report job relevant behavior and reflect what it is intended that students should be able to do upon completion of the training program. As such, these terminal objectives serve to focus all other curriculum development and analysis efforts, aimed at what Popham (1975) described as "validated instructional products." These performance objectives suggest what job content is likely to be relevant and important in training a person in a given task. The job tasks, of which TPOs are elaborations, are direct statements of job performance requirements.

Terminal Performance Objectives do not spell out the means by which competence may be attained through training, but they do serve as the essential basis for designing performance based learning experiences and for developing criterion-referenced achievement tests. TPOs express the intended level of performance development for each job-relevant task. They establish meaningful and measurable target goals for learning, upon which all other aspects of the instructional program must be based, regardless of what else is done in designing meaningful learning experiences in particular training situations. The full derived set of TPOs for an occupation represent the planned content of the curriculum.

If instructional considerations of limited time or resources should require that learning something less than the TPO behavior be the limited objective for a particular training program, then that deviation should be acknowledged. Such an acknowledgement serves as the incentive to continue

seeking the means of reaching that objective. When such a modified objective is the only available statement of the learning goal, too often the need for the terminal behavior becomes obscured and unrecognized. Thus, the job-derived TPO should continue to be acknowledged as the ultimate learning goal. It is realized that modifications of a TPO to reflect partial instructional intentions or school-based simulations of the job-relevant performance are often necessary. However, school-modified objectives should not be confused with TPOs. TPOs are derived from performance requirements of the job: they are not themselves influenced by instructional resources or student characteristics.

Figure 2 illustrates the sequential flow of process operations involved in this Task Survey process. Major units of the figure correspond to the contents of Volumes 2, 3, and 4. Blocks within each major unit roughly correspond to the various general activities and specific procedural steps.

In summary, the Task Survey process consists of a number of integrated operations which assist researchers and curriculum developers to move from the definition of the training and occupation of interest, through data collection and analysis, to curriculum content derivation. General elements of the process, achieved via the full performance of all 28 of the specific procedural steps, include such accomplishments as:

- Definition of the scope of the occupational training interest (such as the job setting, related jobs within an occupational area, and performance contingencies).
- Development of a comprehensive list of tasks potentially performed by workers within the work scope defined, with tasks stated at a level and in a form suitable for making curriculum plans and decisions.
- Selection of questions to be asked about each task to provide desired descriptive data on task relevance and/or criticalness.
- Pretesting of instructions or new question formats.
- Design of a sampling plan to obtain representative task data.
- Preparation, printing, and distribution of the task questionnaires (including background items on respondents, work settings, and organizations).
- Administration of the questionnaires to workers and supervisors in accordance with the sampling design.
- Preparation of the questionnaire data for computer processing.
- Computation of selected descriptive summaries of response data for each task for each job, or for other population subgroups within a job.
- Preparation of a report of validated tasks and of task data obtained from the occupational survey, for sharing with others.
- Completion of selected analyses of the data, depending on purposes to be served.
- Application of rules to select tasks for inclusion in training.

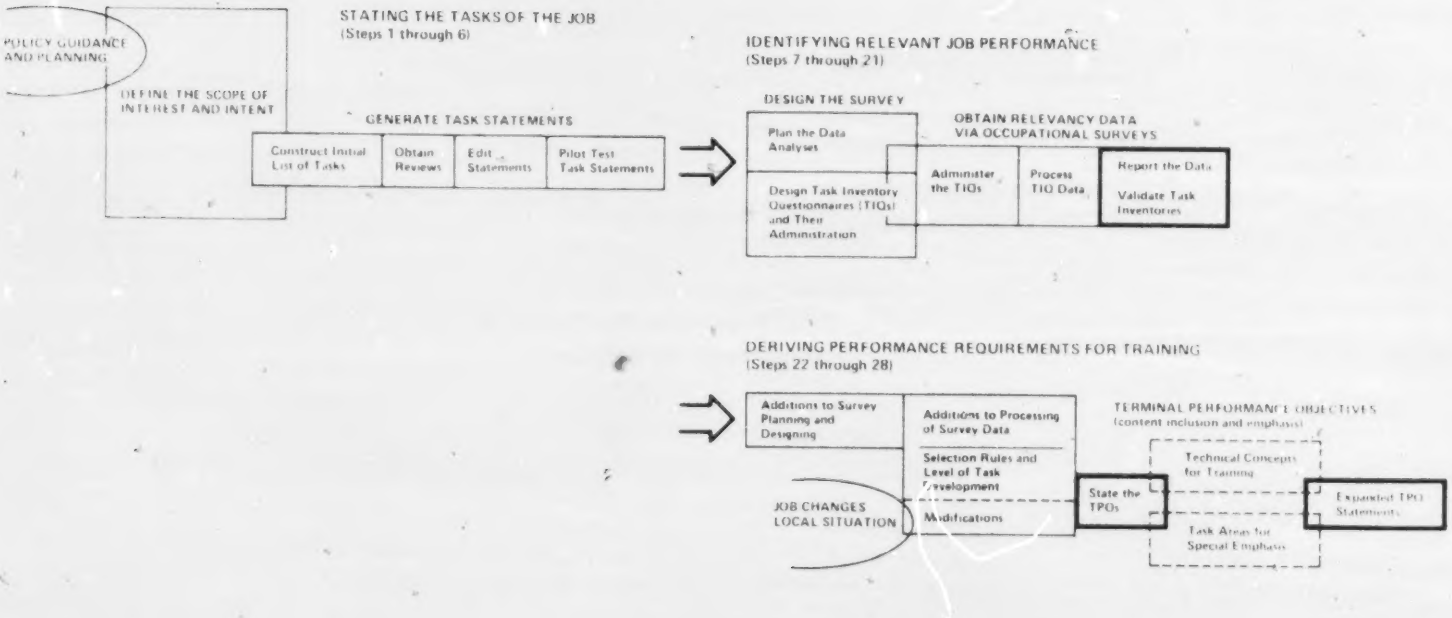
POLICY GUIDANCE AND PLANNING
DEFINE THE SCOPE OF INTEREST AND INTENT
STATING THE TASKS OF THE JOB
(Steps 1 through 6)
GENERATE TASK STATEMENTS
Construct Initial List of Tasks
Obtain Reviews
Edit Statements
Pilot Test Task Statements
IDENTIFYING RELEVANT JOB PERFORMANCE
(Steps 7 through 21)
DESIGN THE SURVEY
Plan the Data Analyses
Design Task Inventory Questionnaires (TIQs) and Their Administration
OBTAIN RELEVANCY DATA VIA OCCUPATIONAL SURVEYS
Administer the TIQs
Process TIQ Data
Report the Data
Validate Task Inventories
DERIVING PERFORMANCE REQUIREMENTS FOR TRAINING
(Steps 22 through 28)
Additions to Survey Planning and Designing
Additions to Processing of Survey Data
Selection Rules and Level of Task Development
Modifications
JOB CHANGES LOCAL SITUATION
TERMINAL PERFORMANCE OBJECTIVES
(content inclusion and emphasis)
State the TPOs
Technical Concepts for Training
Task Areas for Special Emphasis
Expanded TPO Statements

**Figure 2. Sequence of procedural operations as described in Volumes 2, 3, and 4 for the Task Survey process.**

- Determination of the performance level to which each task should be developed in training.
- Modification of task selections or levels in light of other available information on near-future job changes and special requirements of local employment situations.
- Preparation of statements of Terminal Performance Objectives, to convey to others the results of the content identification process and related information.

# PUTTING THE PROCESS INTO ACTION: IMPLEMENTATION CONSIDERATIONS

Time, money, personnel involvement, and coordination of activities are important considerations in decisions and plans to implement the Task Survey process. In this section we suggest some elements that may enter into such considerations. However, each instance of putting the process into action will be different, varying as a function of (a) the occupational scope defined for the survey, (b) the complexity of the occupation(s) to be described, (c) the availability of previously developed task lists of good quality, (d) how readily the cooperation of necessary informants can be obtained, and (e) how experienced the staff participants are in performing each of the procedural activities. Despite these potential variations, general notions of resource requirements are offered here as a guide in planning for implementation. These suggestions assume a reasonably typical application for a single occupation. In practice, time, money, and involvement will vary greatly from any one application to another.

Figure 3 portrays a hypothetical time-activity flow chart, indicating sequential relationships between procedural steps, and the approximate time requirements of each. Whereas the 28 steps are described in the volumes in a logical sequence, certain steps may be done during the same intervals. As will readily be noticed in Figure 3, efforts to generate the initial listing of potential tasks (Steps 2-6) may be accomplished concurrently with planning and preparations for surveying the occupation (Steps 7-13, as well as Steps 22-24). Subsequently, about two or three months should be allowed for sending out questionnaires, contacting respondents, and obtaining completed Task Inventory Questionnaires.

As a general estimate, about 14-15 calendar months will be required for the total process. A large portion of the staff effort likely will be involved in stating the tasks of the job, a most important stage of the process. While appreciable time must be allowed for the administration of the questionnaires, this does not involve much expenditure of staff time. In the subsequent processing and reporting of results, the efforts are essentially clerical in nature, primarily consuming personnel time. The latter procedures, other than for special statistical analyses desired for a particular study, have been developed to be highly routinized. Such simplification of procedural application will be enhanced by the prior accomplishment of effective planning in Steps 7-11 and 22-24. It is in these earlier planning stages (along with the Step 1 definition of the scope of interest) that the most critical decisions must be made. Steps 21B and 27 in the final stages of the process also will involve important decisions.

Table 2 indicates the functional roles of various types of personnel estimated to be needed in certain of the 28 procedural steps. The director of the survey will be especially involved in obtaining a definition of intended occupational scope (Step 1); closely monitoring the quality of task

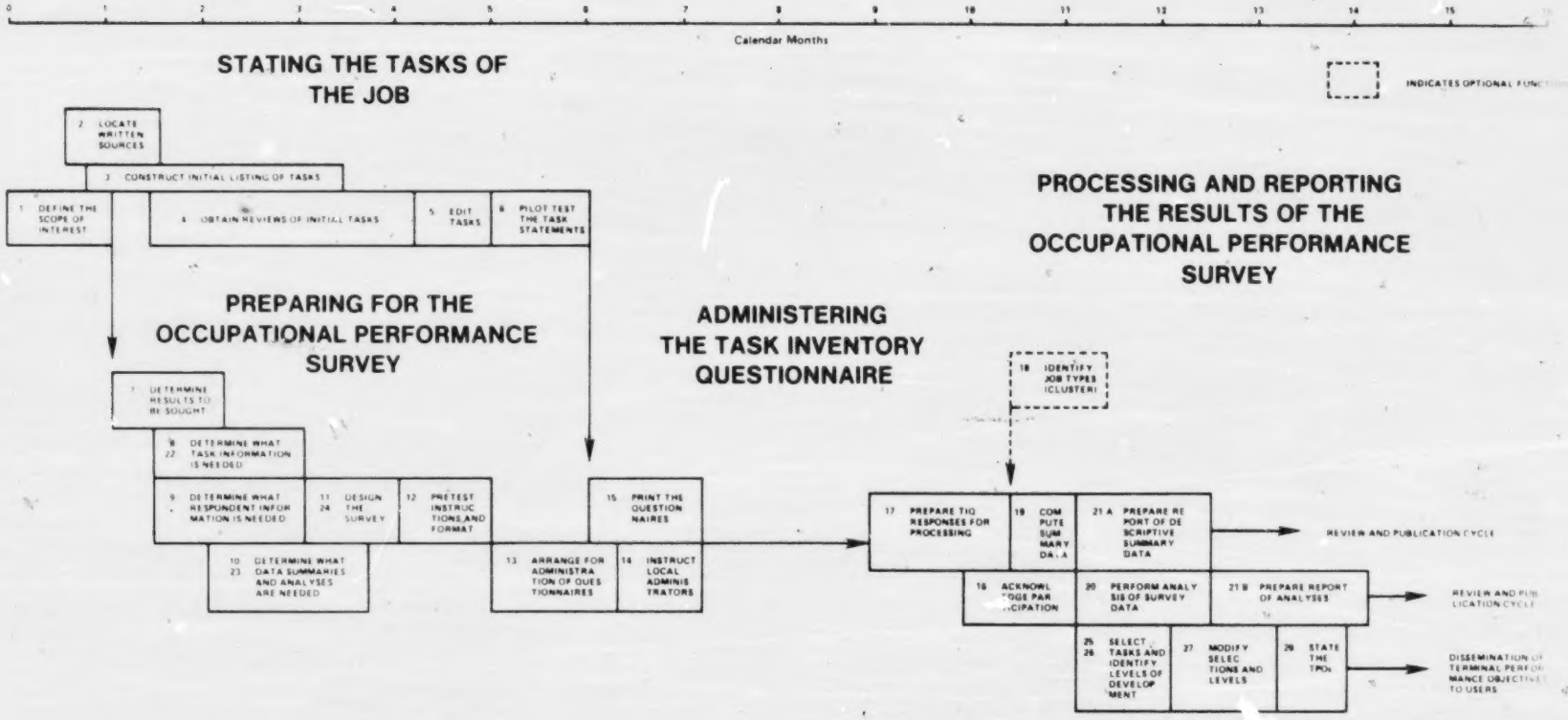
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Calendar Months
INDICATES OPTIONAL FUNC
STATING THE TASKS OF THE JOB
2 LOCATE WRITTEN SOURCES
3 CONSTRUCT INITIAL LISTING OF TASKS
1 DEFINE THE SCOPE OF INTEREST
4 OBTAIN REVIEWS OF INITIAL TASKS
5 EDIT TASKS
6 PILOT TEST THE TASK STATEMENTS
PREPARING FOR THE OCCUPATIONAL PERFORMANCE SURVEY
7 DETERMINE RESULTS TO BE SOUGHT
8 22 DETERMINE WHAT TASK INFORMATION IS NEEDED
9 DETERMINE WHAT RESPONDENT INFORMATION IS NEEDED
11 24 DESIGN THE SURVEY
12 PRETEST INSTRUCTIONS AND FORMAT
10 23 DETERMINE WHAT DATA SUMMARIES AND ANALYSES ARE NEEDED
13 ARRANGE FOR ADMINISTRATION OF QUESTIONNAIRES
14 INSTRUCT LOCAL ADMINISTRATORS
15 PRINT THE QUESTIONNAIRES
ADMINISTERING THE TASK INVENTORY QUESTIONNAIRE
18 IDENTIFY JOB TYPES (CLUSTER)
17 PREPARE TIO RESPONSES FOR PROCESSING
19 COMPUTE SUMMARY DATA
21 A PREPARE REPORT OF DESCRIPTIVE SUMMARY DATA
REVIEW AND PUBLICATION CYCLE
16 ACKNOWL TOGE PAR CIPATION
20 PERFORM ANALYSIS OF SURVEY DATA
21 B PREPARE REPORT OF ANALYSES
REVIEW AND PUBLICATION CYCLE
25 26 SELECT TASKS AND IDENTIFY LEVELS OF DEVELOPMENT
27 MODIFY SELECTIONS AND LEVELS
29 STATE THE TPOs
DISSEMINATION OF TERMINAL PERFORMANCE OBJECTIVES TO USERS
PROCESSING AND REPORTING THE RESULTS OF THE OCCUPATIONAL PERFORMANCE SURVEY

Figure 3. Possible time-activity flow chart for deriving performance content for one typical occupation. Procedural step numbers are given for each activity block.

Table 2

Functional Personnel Roles

| Role | Procedural Steps in Which Personnel Are Primarily Involved |
|---|---|
| Policy Makers | 1, 21A, 21B |
| Staff: | |
| Survey Director | All |
| Technical Assistants and Analysts | All |
| Secretary | All |
| Staff Advisors: | |
| Statistical | 10, 18, 20, 21B, 23 |
| Computer Programming | 10, 17, 18, 19, 20, 23 |
| Craft or Trade Advisory Committee | 2, 4, 9, 11, 24, 27 |
| Support: | |
| Keypunch | 17 |
| Computer Operation | 18, 19, 20 |
| Printing | 15, 21A, 21B |
| Informants: | |
| Workers and Supervisors | 4, 5, 12, TIQ, 16 |
| Others | 4, 27 |
| Local Administrators | 13, 14, TIQ, 16 |
| Endorsing Agencies | 13 |

statements generated (Steps 3-6); making decisions regarding survey plans (Steps 7-11, 22-24); arranging for local administration of questionnaires (Steps 13-14); and quality assurance for the data processing, analyses, conclusions, and reporting of results (Steps 16-21, 25-28). The director and staff assistants and analysts all need skills in:

1. Interviewing to identify tasks.

2. Clearly communicating in statements of work activity.

3. Attending to detail in stating tasks, planning survey questionnaires and administration, and compiling and reporting results.

4. Sensitivity to the interests and concerns of employees, employers, local administrators, and other cooperating individuals and agencies in direct contacts with them and in reporting their participation.

Budgetary considerations for accomplishing the complete Task Survey process for an occupation are suggested in Table 3. Rough estimates are given for certain compensation rates and expenses to aid in preparing forecasts of likely costs. Because the entire process, at the time of this writing, has not been tried out in a full operational situation, costs cannot be fully specified. However, based upon our experiences thus far with components of the process, a ballpark figure of expenses for surveying a single typical occupation (excluding staff salaries, personnel benefits, and institutional overhead) is estimated to be around $9,000. Total costs will differ from one situation to another, depending upon the availability of contributed services, scope and complexity of the occupation to be surveyed, staff salary rates, availability and usefulness of prior task lists, and experience of the staff in performing the Task Survey process.

The greatest cost area is in generating the initial task lists. This function consumes a large proportion of staff personnel costs. If good previously generated task lists are available, this cost area can be reduced considerably. Thus, subsequent readministrations of task surveys, to update the task information and note changes and trends, are likely to be about one-third to one-fourth the total cost of a complete first-time effort. Further reductions are reasonable to expect as the staff gains experience and many of the steps become routine clerical operations for data processing and reporting.

Questionnaire administration and subsequent analyses are increasingly time-consuming and costly as multiple subgroups of respondents are added to the survey design. The simplest and least costly mode is to survey a single occupation with one group of workers and one group of supervisors. Related occupations to be surveyed with the same Task Inventory Questionnaire require another group of workers and of supervisors for each additional occupation. Within an occupation, if survey results are sought for several distinct types of workers or of work situations, then each of these would involve additional subgroups of questionnaire respondents. Each such addition produces greater complexity and cost, and greatly increases the problem of local administrators in locating appropriate persons to respond to the survey questionnaires. The merit of including such survey variations should be carefully evaluated in advance to assure that they will be worth the cost and effort.

Table 3

Likely Budget Considerations for Complete
One-Time Survey of an Occupation

| Budget Category | Approximate Rate |
|---|---|
| Staff Salaries and Wages (Professional, Clerical, Statistical and Programming Advisors) | – |
| Staff Personnel Benefits | – |
| Other Personnel Compensation: | |
| TIQ Respondents – Workers | $10 per hour, assuming 1 hour per task question per person |
| TIQ Respondents – Supervisors | $15 per hour, assuming 1 hour per task question per person |
| Local TIQ Administrators | $5 per completed TIQ |
| Craft or Trade Advisory Committee | – |
| Travel: | |
| Local Mileage for Staff Interviews to Generate and Pilot Test Task Statements | – |
| Air Fare for Each Local TIQ Administrator to Attend Meeting | – |
| Per Diem for TIQ Administrators Attending Meeting | – |
| Local Mileage for TIQ Administrators Contacting Employers and Employees | – |
| Supplies and Materials: | |
| Office Supplies (Expendable) | – |
| Duplication and Reproduction | – |
| Reference Documents Acquisition | – |
| Data Processing Cards and Tapes | – |
| Services and Equipments: | |
| Computer Operation for Processing TIQ Data | $150 plus any special analyses |

**Table 3 – Continued**

| Budget Category | Approximate Rate |
|---|---|
| Keypunch TIQ Responses | 10 minutes per task question per respondent |
| Communications: | |
| Postage and Express (Including Distribution of Reports) | – |
| Long-Distance Telephone Calls (to/from Local TIQ Administrators) | – |
| Printing: | |
| Copy Preparation (TIQ, Reports) | – |
| Printing and Binding (TIQ, Reports) | – |
| Indirect Costs and Fixed Fees | – |

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# APPENDIX

# GLOSSARY OF TERMS

**Pertaining to Divisions of Work Assignments** (listed from general to specific)

1. *Occupational Area:* A cluster of closely related jobs, where that relationship depends upon commonly accepted groupings of jobs by reason of similarity of systems worked upon, or of common subject-matter content or technical concepts. An occupational area may be called a career ladder or career lattice, but also may encompass occupations of a somewhat broader nature.

2. *Job:* A specific vocation, trade, profession, craft, or occupation serving as a line of work or employment, where most workers typically are called by the same or synonymous job title. A job is not limited to one employment position or one worker category within a single employing firm. However, it is located at only one status level in an occupational area or career ladder, and is distributed across many employment settings. The term "occupation" is used synonymously with "job."

3. *Duty:* An arbitrary division of a job (or of an occupational area) into functional categories of related tasks for descriptive purposes. Duties represent relatively large segments of work performed that are related in some manner.

4. *Task:* A meaningful unit of work activity, generally performed on the job by one worker within some limited period of time. It is a purposeful job-oriented activity of a worker.

   *Work Activity:* Same as "Task." Implies a purposeful unit of work having direct value in accomplishing the goals of the job. Thus, it would not be a component part of a task such that it had value only in relation to that task, but is in fact a meaningful task of the job itself.

   Other terms used synonymously with "Task" are *Job Activity* and *Job Task.*

**Pertaining to Survey Methodology and Curriculum Planning**

1. *Concept Inventory:* A comprehensive listing of technical concepts used by workers in a job or occupational area.

2. *Criticalness:* The merit of a task being included in a training program; the indication of the need for some formal training prior to employment.

3. *Curriculum:* A structured series of learning outcomes; a composite of statements of "*what* is to be learned" by a learner in a particular instructional program; a product stating "intended learning outcomes" which have been selected and ordered, and emphasizing what is the planned *content* of a program.

4. *Curriculum Content:* Selected tasks, and the degree and area of emphasis for each, that are considered important training goals for the job or other performance situation for which students are to be prepared.

5. *Derived Content:* Tasks of a job which have been selected as both job-relevant and critical for inclusion in a training program.

6. *Employer Expectation Questionnaire (EEQ):* An instrument by which employer representatives who are knowledgeable of worker performance requirements may indicate the nature and emphasis of job content for which pre-employment training is expected.

7. *Instruction:* Whereas curriculum is a *product* which states program content and objectives, instruction is the *process* by which the intended learning outcomes would be achieved, noting *how* such learning is to be attained.

8. *Job-Derived:* Based on factors within the work performance situation (*not* considering any issues of instructional resources or student characteristics).

9. *Job-Derived Learning Requirements:* Same as *Derived Content.*

10. *Occupational Performance Survey:* Task performance data resulting from the administration of a Task Inventory Questionnaire.

11. *Occupational Survey:* Same as *Occupational Performance Survey,* implying the administration of Task Inventory Questionnaires.

12. *Occupational Survey Report:* A publication that reports the descriptive summaries of task data, for potential use by other interested parties.

13. *Relevant Content:* Tasks having direct and unmodified relationship to requirements of (or occurrence in) the work performance situation.

14. *Task Areas for Training Emphasis:* Areas or aspects of task performance or knowledge which may warrant emphasis in the training of a task.

15. *Task Data:* Responses of workers or supervisors to task questions contained in a TIQ.

16. *Task Inventory:* A comprehensive listing of tasks performed by workers in a job or occupational area. When a task listing is combined with one or more questions to be asked about each task, the resulting instrument is called a Task Inventory Questionnaire. When the relevance of each task to an occupation is known, the listing represents a validated task inventory.

17. *Task Inventory Questionnaire (TIQ):* An occupational survey instrument containing a listing of tasks and one or more selected questions about each task, with accompanying instructions and answer sheets. May include questions on the background of the respondent and associated agency.

18. *Task Inventory Survey:* Same as *Task Inventory Questionnaire.*

19. *Task Inventory System (TIS):* A computer program for processing task data and providing output tables of summary values for each task.

20. *Task Question:* One of several questions that might be asked about each task on a TIQ (e.g., frequency of task performance, task significance to the job, rating of appropriate learning location for a task).

21. *Task Selection Factor:* A task factor identified as useful for selecting tasks that warrant consideration in a training program.

22. *Task Survey Process:* A survey-questionnaire approach to job analysis for providing performance data of use in deriving relevant and critical curriculum content for occupational training programs. Since the process uses Task Inventory Questionnaires, it is also sometimes called the "Task Inventory" method. Mistakenly, the general approach is also frequently referred to as "Task Analysis," but task analysis more accurately refers to a detailed process that follows the accomplishment of the Task Survey analyses, focusing on particular individual tasks.

23. *Technical Concept:* A class (or category) of specialized knowledge having practical use to workers in the effective performance of their job.

24. *Terminal Performance Objectives (TPOs):* Statements of the job-relevant learning requirements, stated in terms of task performance relevant to the intended work situations. They serve to record and communicate to others the derived curriculum content.

    When the TPO is modified to reflect behaviors or knowledges which are only pertinent to an instructional setting, it would then be called a *Student Performance Objective.* When component elements of task performance are identified as subgoals of the task training, these specific operations and information are called *Enabling Objectives,* since they are enablers of the intended terminal behavior capability.

25. *Training Program:* The complete curriculum and instruction (*what* and *how*) that intends to prepare a person for initial employment in a targeted job or other particular performance situation, assuming no prior job-specialized training or experience. A program may be composed of one or many instructional courses and units, whether mandatory or elective. It is the totality of planned learning experiences, classroom or other, that deliberately serve to prepare the student for effective employment in a particular job or occupation.

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## RELATED PUBLICATIONS AVAILABLE FROM THE CENTER FOR VOCATIONAL EDUCATION

### OTHER METHODOLOGIES FOR DERIVING CURRICULUM CONTENT

Related Center publications augmenting the procedures and guidelines of the five-volume *Performance Content for Job Training* are:

The initial adaptation of U.S. Air Force occupational survey procedures for application in civilian contexts. This version provides a useful introduction to the methodology of task inventory surveys.

*Procedures for Constructing and Using Task Inventories* (R&D Series No. 91), March 1973.

Complementing the focus on the task performance content of jobs is the methodology for surveying work-related technical concepts which have practical use to workers in the effective performance of their job. Concept inventory procedures are described and a descriptive report of job significance ratings is given for concepts in the occupations of automotive mechanics, business data programmers, and general secretaries.

*Rating the Job Significance of Technical Concepts: An Application to Three Occupations* (R&D Series No. 105), December 1974.

Exploratory ways of identifying that work-relevant affect by which workers in an occupation approach their job, their coworkers, and the entire work environment. Procedures are suggested, and initial tryout results are reported, for a promising approach to the identification of those non-technical aspects of the job which contribute to worker satisfaction and success. A companion report is provided for processing the associated worker data.

*A Methodology to Assess the Content and Structure of Affective and Descriptive Meanings Associated with the Work Environment* (R&D Series No. 98), December 1974.

*RCMAT: A Computer Program to Calculate a Measure of Associative Verbal Relatedness* (Occasional Paper No. 6), 1975.

### OCCUPATIONAL SURVEY REPORTS

Providing field data for establishing the methodology of the five volume *Performance Content for Job Training* are:

Three reports of task surveys conducted for specific occupations. These 1974 surveys were obtained from numerous communities in eight states distributed across the nation. Both workers and immediate supervisors, 200 per occupation, provided task data on an array of experimental questions pertaining to (a) task occurrence, (b) frequency of task performance, (c) task significance to the job, (d) time on job before task qualification is expected, (e) task importance to the job, (f) suggestions of performance problem areas, and (g) primary learning locations for each task.

*Occupational Survey Report on Business Data Programmers: Task Data from Workers and Supervisors Indicating Job Relevance and Training Criticalness* (R&D Series No. 108), December 1974.

*Occupational Survey Report on General Secretaries: Task Data from Workers and Supervisors Indicating Job Relevance and Training Criticalness* (R&D Series No. 109), January 1975.

*Occupational Survey Report on Automotive Mechanics: Task Data from Workers and Supervisors Indicating Job Relevance and Training Criticalness* (R&D Series No. 110), January 1975.

A 1971 survey of workers in one metropolitan area was conducted for entire occupational areas incorporating several specific occupations. Field data were obtained on (a) task occurrence and (b) relative proportion of time spent on each task. The survey reports include comparisons between related occupations, and generate the initial listing of tasks used in subsequent studies of specific occupations within each occupational field.

*Automotive Mechanics Occupational Performance Survey* (R&D Series No. 86), March 1973.

*Secretarial Science Occupational Performance Survey* (R&D Series No. 87), March 1973.

*Business Data Processing Occupational Performance Survey* (R&D Series No. 88), March 1973.

### SURVEY OF CURRICULUM DEVELOPERS

Providing information on the activities and needs of curriculum developers is the 1974 survey of more than 300 persons in education and training, both public and private, throughout the nation. The survey analysis emphasizes the responses of curriculum developers concerned with vocational education to the list of 68 work activities, but includes other areas of public education, business/industry, and government agencies. Responses were given to activity questions pertaining to (a) occurrence of the activity, (b) degree of problem encountered in performing each activity, and (c) activity importance to the job.

*Activities, Problems, and Needs of Curriculum Developers: A National Survey* (R&D Series No. 115), May 1976.

### TASK INVENTORY EXCHANGE

To promote the sharing and general availability of task inventories and of occupational surveys, a central clearinghouse is conducted for the collection and dissemination of materials prepared by agencies in education, labor, agriculture, industry, business, government, the professions, and various special interest groups. Three volumes of a directory of over 800 available task inventories so far have been published. Additionally, a symposium on methodologies was sponsored at which 15 presentations were made to an audience of 158 persons from 26 states, sharing their experiences, problems, solutions, and thinking on various aspects of the issue.

*Directory of Task Inventories. Volume 1, 1974* (UN Series No. 6), January 1975.

*Directory of Task Inventories. Volume 2, 1975* (UN Series No. 7), 1975.

*Directory of Task Inventories. Volume 3, 1976* (UN Series No. 8), 1976.

*Proceedings of a Symposium on Task Analyses/Task Inventories* (UN Series No. 10), November 1975.